



A.D. 1841 N^o 8794.

S P E C I F I C A T I O N

OF

EDWARD FOARD.

MACHINERY FOR SUPPLYING FUEL TO
FURNACES OF STEAM BOILERS AND
OTHER FIRE-PLACES.

L O N D O N :

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Machinery for Supplying Fuel to Furnaces of Steam Boilers and other Fire-places.

FOARD'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, EDWARD FOARD, of Queen's Head Lane, Islington, Machinist, send greeting.

WHEREAS Her present most Excellent Majesty Queen Victoria, by Her Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Sixteenth day of January, in the fourth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Edward Foard, Her especial licence, full power, sole privilege and authority, that I, the said Edward Foard, my executors, administrators, and assigns, or such others as I, the said Edward Foard, my executors, administrators, or assigns, should
10 at any time agree with, and no others, from time to time and at all times during the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick upon Tweed, my Invention of "**AN IMPROVED METHOD OR IMPROVED METHODS OF SUPPLYING FUEL TO THE FIRE-PLACES OR GRATES OF STEAM-ENGINE BOILERS, BREWERS' COPPERS, AND OTHER FURNACES, AS WELL ALSO TO THE FIRE-PLACES EM-**
15 **PLOYED IN DOMESTIC PURPOSES, AND GENERALLY TO THE SUPPLYING FUEL TO FURNACES**

FIRE-PLACES, IN SUCH A MANNER AS TO CONSUME THE SMOKE GENERALLY PRODUCED IN SUCH FURNACES OR FIRE-PLACES ;" in which said Letters Patent is contained a proviso that I, the said Edward Foard, should cause a particular description
20 of the nature of my said Invention, and in what manner the same is to be performed, to be inrolled in Her said Majesty's High Court of Chancery within

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six calendar months next and immediately after the date of the said in part recited Letters Patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

NOW KNOW YE, that in compliance with the said proviso, I, the said Edward Foard, do hereby declare the nature of my said Invention, and the 5 manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the Drawings hereunto annexed, and to the figures and letters marked thereon, that is to say:—

My Invention relates to that description of furnaces and fire-places where 10 the fuel is supplied from below upwards, and in order that my Invention may be most fully understood, and readily carried into effect, I will proceed to describe the Drawings hereunto annexed, in which the same letters of reference are used to indicate similar parts.

DESCRIPTION OF THE DRAWINGS.

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Figure 1 represents a longitudinal section of a steam-engine boiler furnace having my Invention applied thereto. Figure 2 is a plan of the furnace separately. Figure 3 is a side view thereof separately. Figure 4 shews an end view of the steam boiler and furnace; and Figure 5 shows a transverse section of the boiler and furnace. *a, a*, are the fire bars. *b, b*, is what I call the 20 coking oven; it consists of a quadrangular chamber placed below the fire bars, but opening into the furnace, as is shewn in the various Figures of the Drawings. Within the chamber *b, b*, is placed a piston, and which fits the interior of the chamber, but capable of being freely raised and lowered therein by means of the racks and pinions *d d, e e*, the racks *d* being affixed to the 25 under side of the piston *c*, and the pinions *e* are affixed to the shaft or axis *f*, which turns in bearings *f¹, f¹*, as is clearly shewn in the Drawings. *g, g*, are guide rollers of the racks *d*, and the piston *c* is guided up and down by the projecting surfaces *h, h*, within the chamber or coking oven *b, b*. At the front end of the coking oven or chamber *b* there is applied a door *i*, through which 30 the fuel is thrown on to the piston *c* when the piston is lowered down for a fresh supply of fuel. *j* is a wheel having holes similar to the head of a capstan to receive hand spikes or bars *k*; this wheel *j* is affixed to the axis or shaft *f*, and by means of hand spikes or bars *k* the axis *f* is turned round, by which means the piston *c* is raised or lowered, and the piston is kept to any height to which 35 it has been raised by the check or catch *f²* taking into the ratchet wheel *f³* affixed on the axis *f*. *l* is a sliding plate, or it may be a grating of bars combined, which moves on the upper part of the chamber or coking oven, as

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is shewn, or other convenient means may be resorted to for producing and closing of an opening into the fire-place or furnace over the chamber or oven. A rack *m* is affixed on the under side of the sliding plate *l*, and motion is communicated to the sliding plate *l* by means of the crank handle *n* affixed on the
5 axis or shaft *o*, such shaft or axis turning in bearings *p*, as is shown. *q* is a bevel toothed wheel affixed on the axis or shaft *o*. The wheel *q* takes into and drives a wheel *r* affixed on the short axis *s*, and on the same axis *s* is affixed the toothed wheel *t*, which takes into the rack *m*, and by such means the sliding plate *l* may be moved over the chamber or coking oven, or with-
10 drawn therefrom, as occasion may require. Supposing the furnace to have been at work some time, and the piston to have been raised to its highest position, the mode of supplying fresh fuel is as follows:—The sliding plate *l*, which has been out of use during the time that the previous charge of fuel in the chamber or coking oven has been progressively raised and supplied into the
15 furnace, is now to be slid over the coking oven or chamber, and consequently under the burning fuel of the furnace. By this means the burning fuel over the chamber or coking oven will be supported, and allow of the piston being lowered, in order to receive a supply of fuel thereon, which will readily be supplied through the doorway in front of the chamber or coking
20 oven, as above described. The chamber or coking oven being charged, the door is to be closed and fastened, and the piston raised so as to bring the fresh fuel close under the sliding plate *l*; that plate is then to be withdrawn, and it will remain out of use until the piston has again been raised to its highest position, when it will again be slid in to sustain the burning fuel above the
25 chamber or coking oven, and thus again allow of the piston descending to have fresh fuel supplied into the coking oven or chamber as before described. I will now proceed to describe another arrangement of furnace with apparatus for supplying fuel thereto very similar to that above described, but differing inasmuch as there being no sliding plate *l*, but a temporary plate which acts in place thereof
30 to sustain the fuel, which is above the chamber or coking oven when the piston has to descend, in order to there being a fresh supply of fuel fed into the coking oven or chamber. Figure 6 shews a longitudinal section of a steam boiler and furnace with my Invention applied thereto. Figure 7 is a front end view, and Figure 8 is a transverse section, of the boiler and furnace. In these
35 Figures the same letters are used to indicate the similar parts to those described in the previous Drawings, and it will not be necessary again to describe such parts, as their mode of working has been already described. In this arrangement of my Invention the sliding plate *l* before described is dispensed with, and the temporary plate *v* used in place thereof. *w* are four spring or lever

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stops or supports, their upper ends passing through openings formed at the sides of the chamber or coking oven, and such upper ends have at all times a tendency by their springs to remain within the chamber or coking oven, as will readily be understood, on examining the Drawings now under description. The door at the front of the chamber or coking oven is divided into 5 two parts, the smaller part being at the top, and this is to allow of the plate *v* being withdrawn, when a fresh supply of fuel has been fed into the coking oven or chamber. In working this arrangement, supposing the fire to have been at work some time, and that the plate *v*, resting on the piston *c*, has been raised to its highest position, it will have passed the upper ends of the spring 10 or lever stops or supports, and will be supported thereby, there being notches formed in the piston opposite the spring and stops or supports, so as to allow the spring stops or supports coming under the plate *v*, so soon as that plate has passed above those stops or supports; the burning fuel will now be supported above the plate *v*, and the piston may be lowered down in order to 15 admit of a fresh supply of fuel to the chamber or coking oven through the door way in front, as before described. There being a plate *v* first placed on the piston, the chamber being charged, the doors are then to be closed, and the piston raised so as to bring the fresh supply of fuel under the plate *v*, when the upper part of the door is to be opened, and the upper plate *v* drawn out by 20 a hook or other convenient instrument, and in this manner is the furnace to be worked. I have not thought it necessary to shew furnaces applied to other than a steam boiler for a fixed steam engine, as it is well known that a furnace for locomotive or for marine steam engines, and for a brewer's copper, or for other boiling and evaproating vessels, will not materially vary from that shewn; 25 indeed the arrangement of furnaces are so similar one to another for whatever purpose they may be applied, that a workman capable of constructing a furnace for a particular object will readily apply my Invention thereto, from the description above given, aided by the Drawings annexed.

I will now describe my Invention as applied to open fire-places. Figure 9 30 shews a front view of a cooking range having my Invention applied thereto, and the parts are similar to the arrangements shewn in Figures 1, 2, 3, 4, and 5, being only so modified as to adapt them to this description of fire-place. But I would remark, that if preferred, the plate *v* may be used in place of the plate *l*, which is shewn by varying the parts accordingly. Figure 10 is a transverse section of 35 Figure 9. The parts employed in applying my Invention, as shewn in Figures 9 and 10, being marked with the same letters of reference as those of Figures 1, 2, 3, 4, and 5, the description of those parts before given will be sufficient to describe the nature and use of the parts shewn in Figures 9 and 10, when

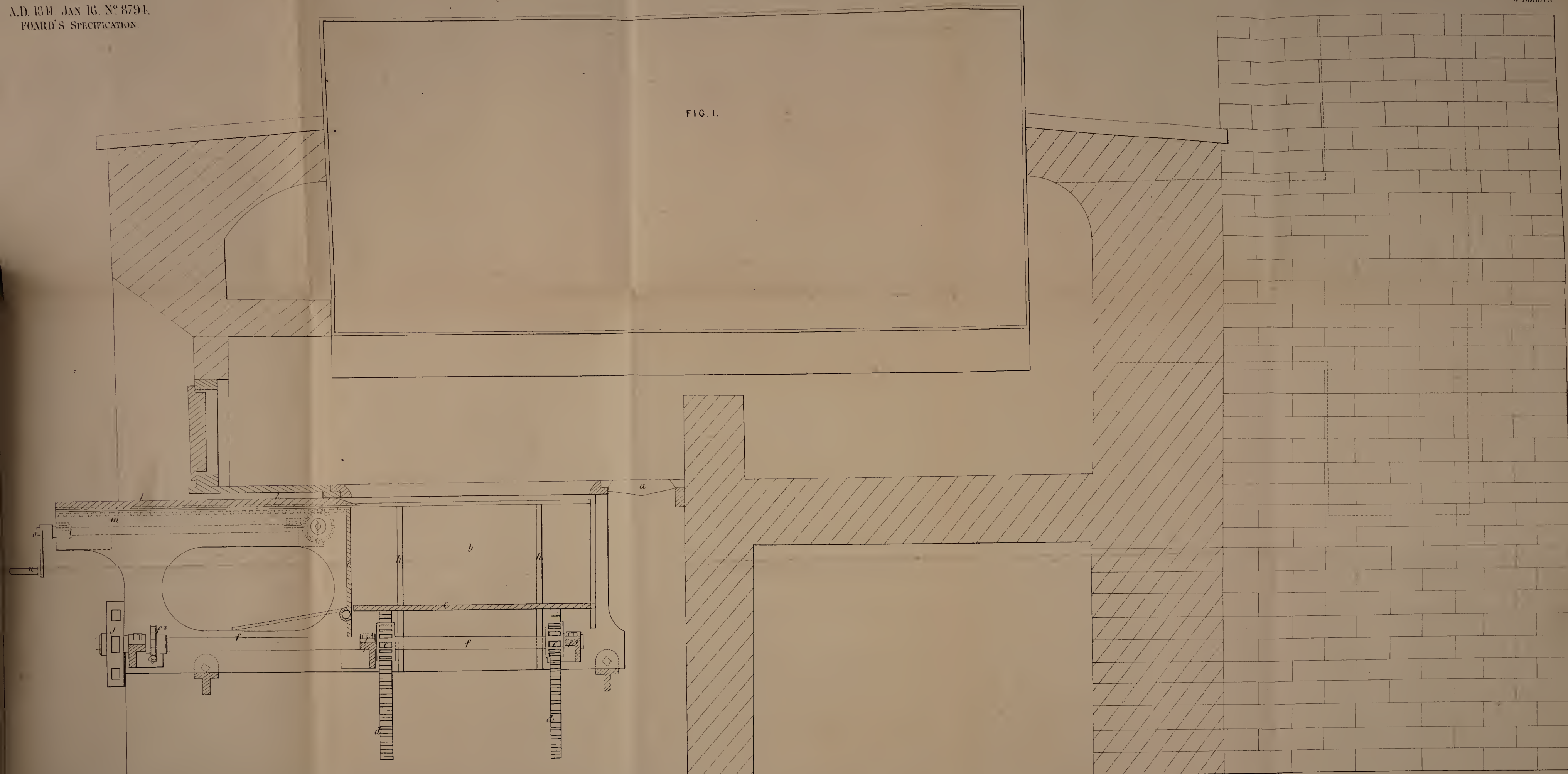


FIG. 2.

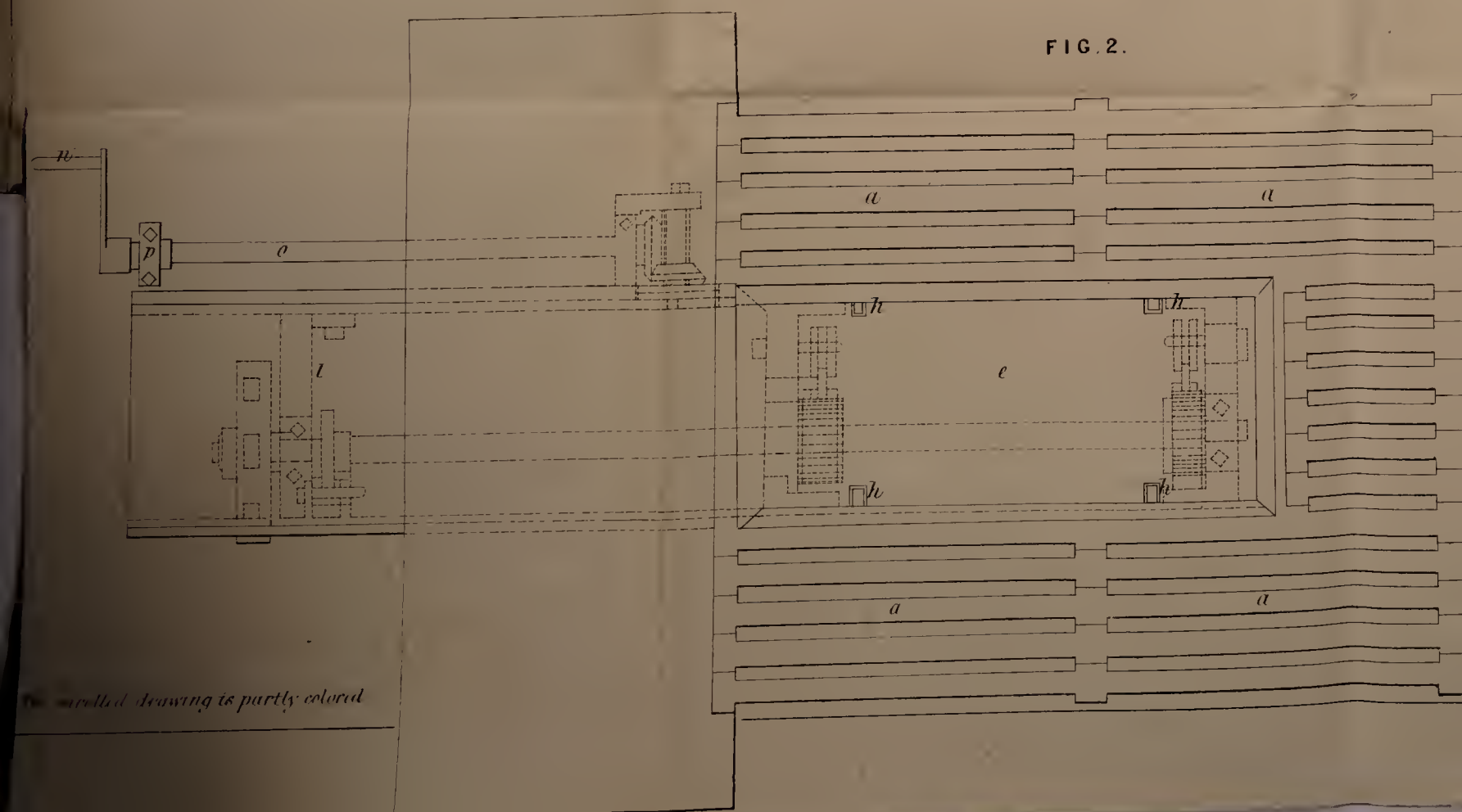


FIG. 3.

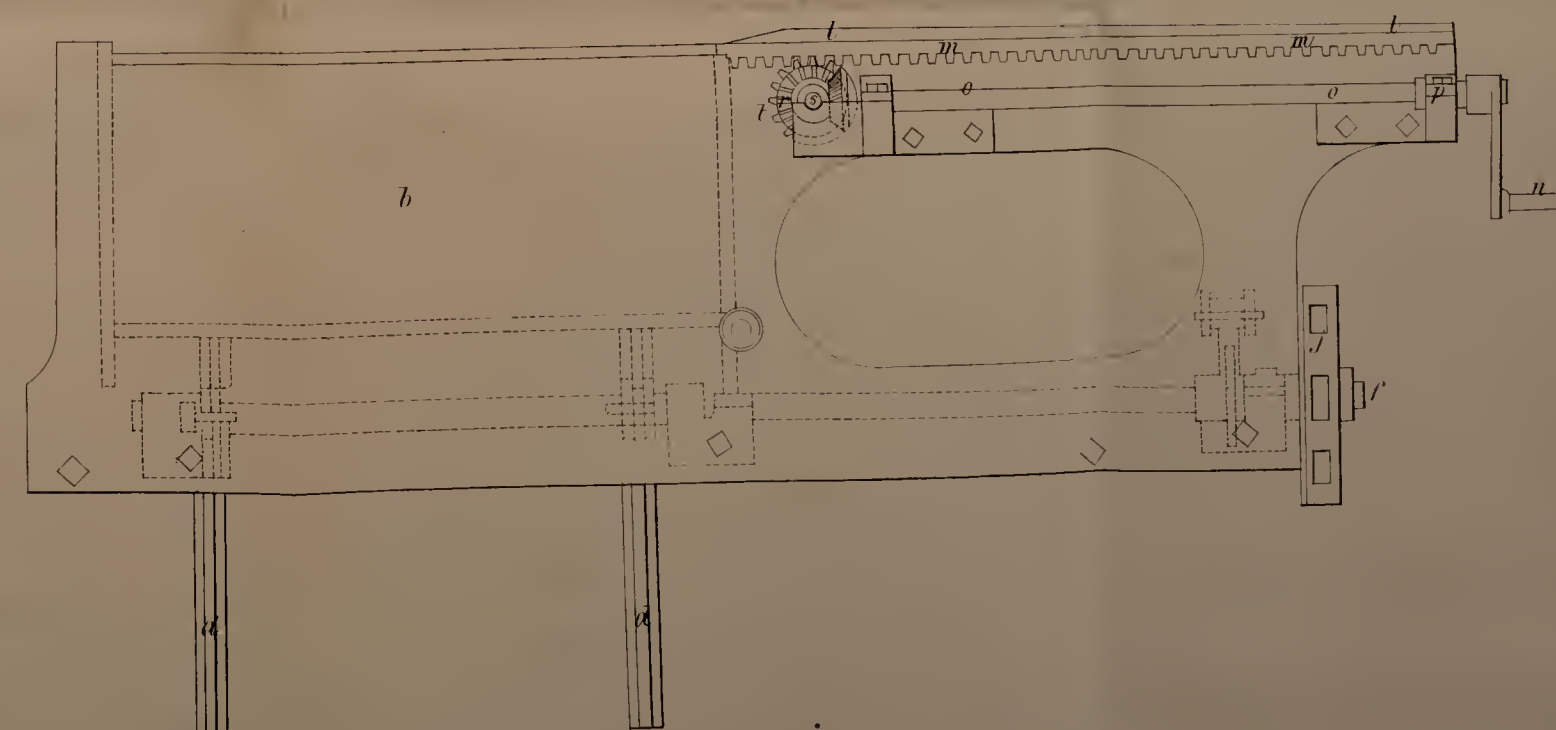


FIG. 5.

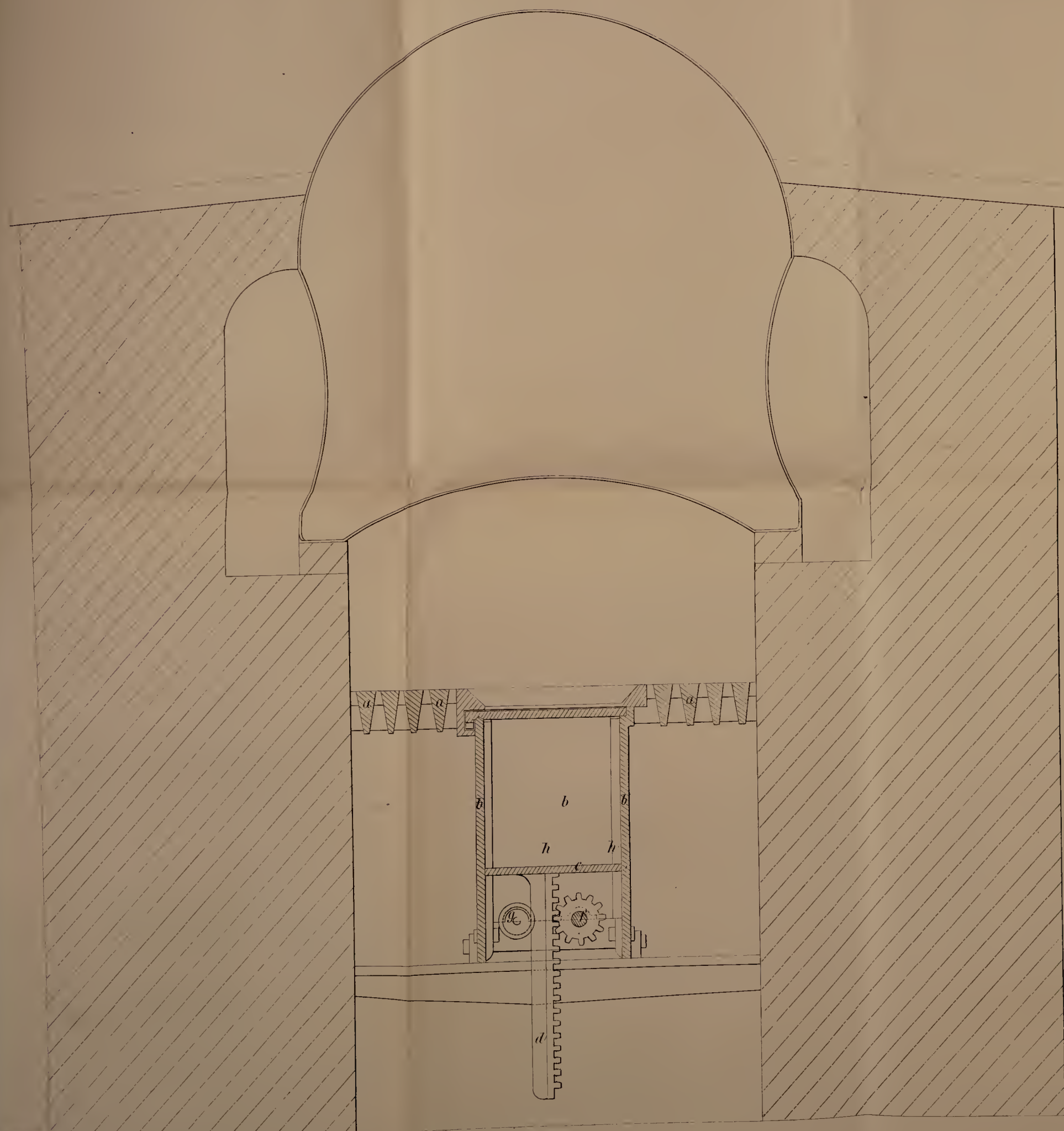


FIG. 4.

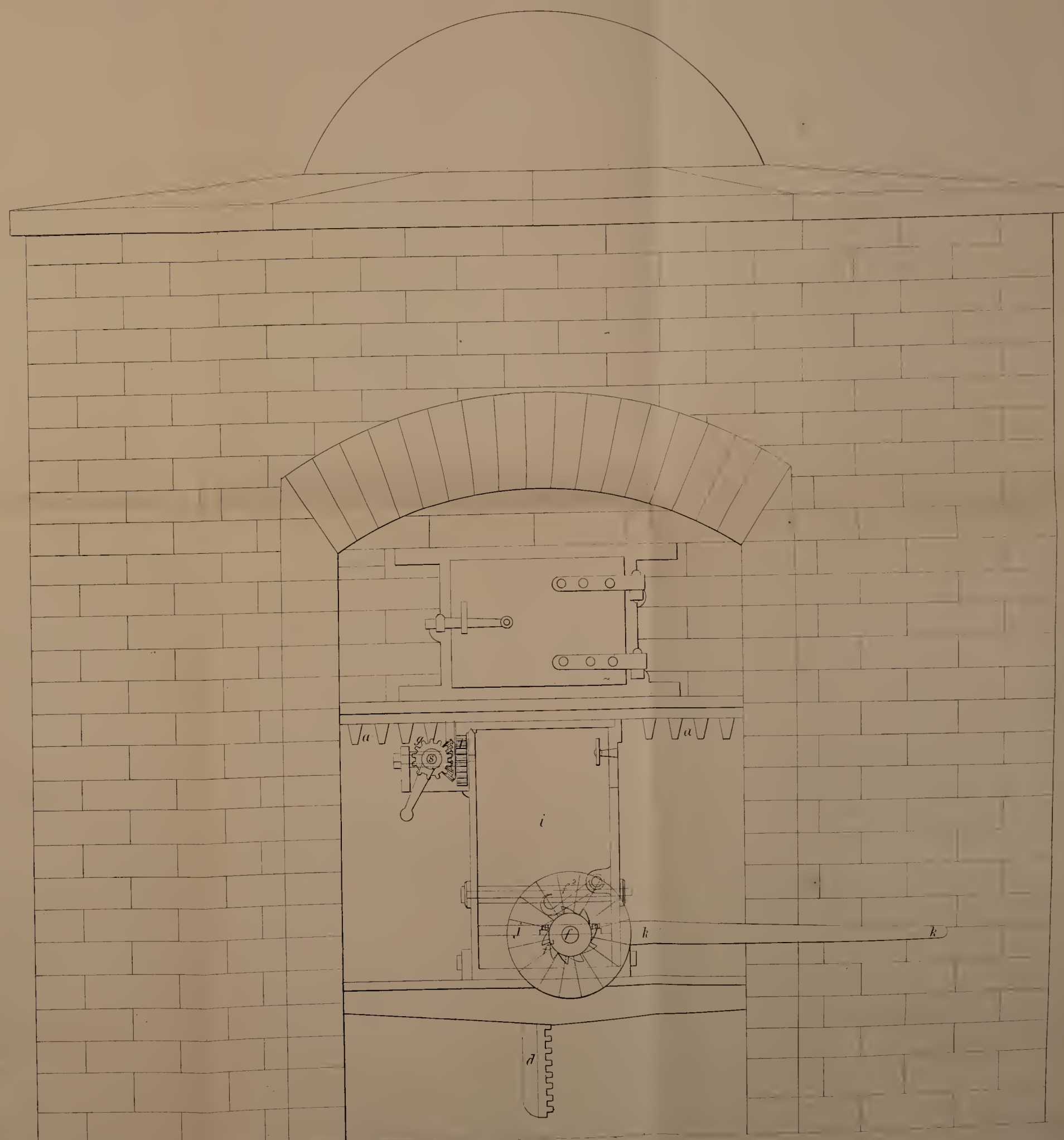


FIG. 6.

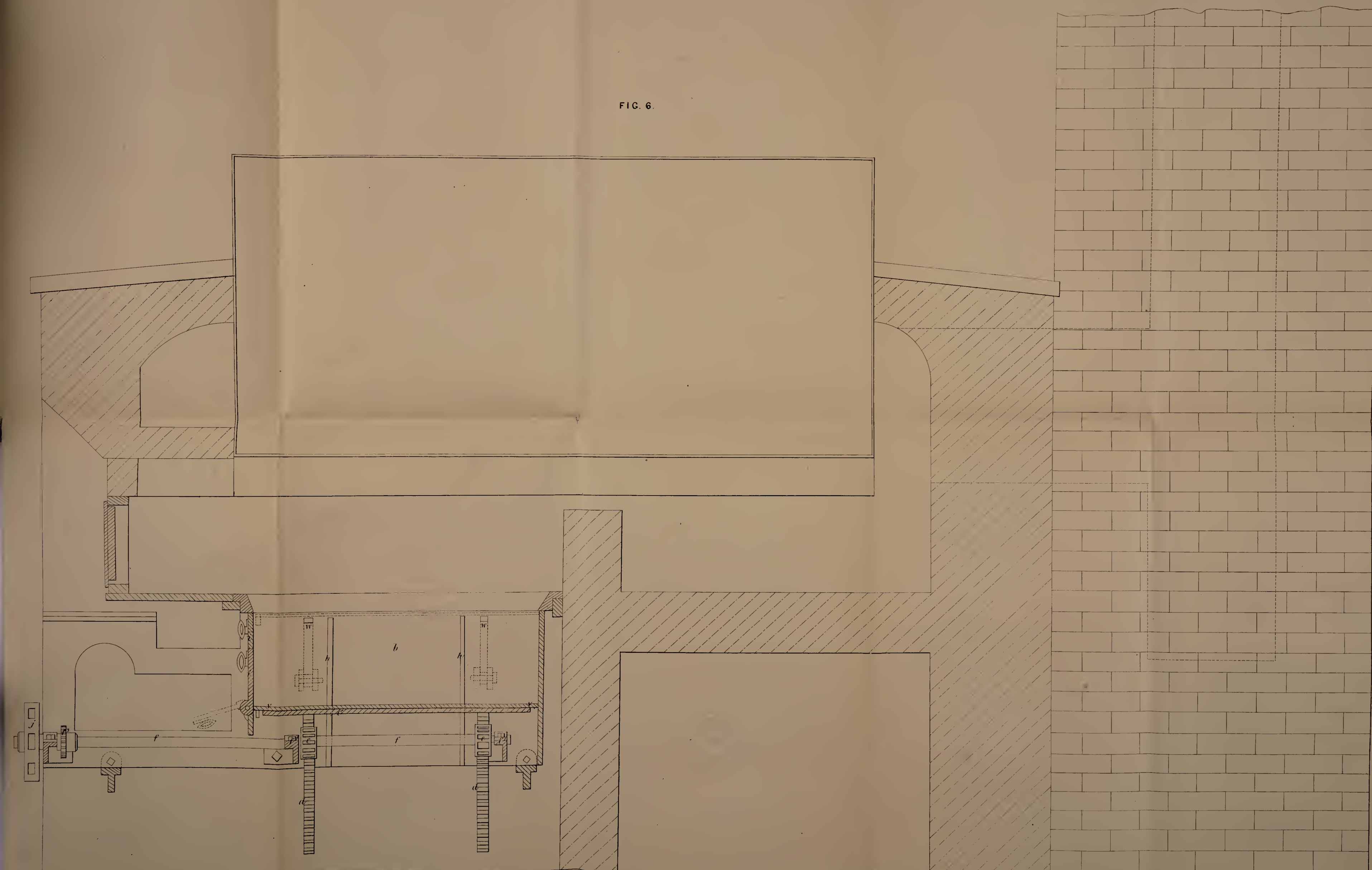


FIG. 8.

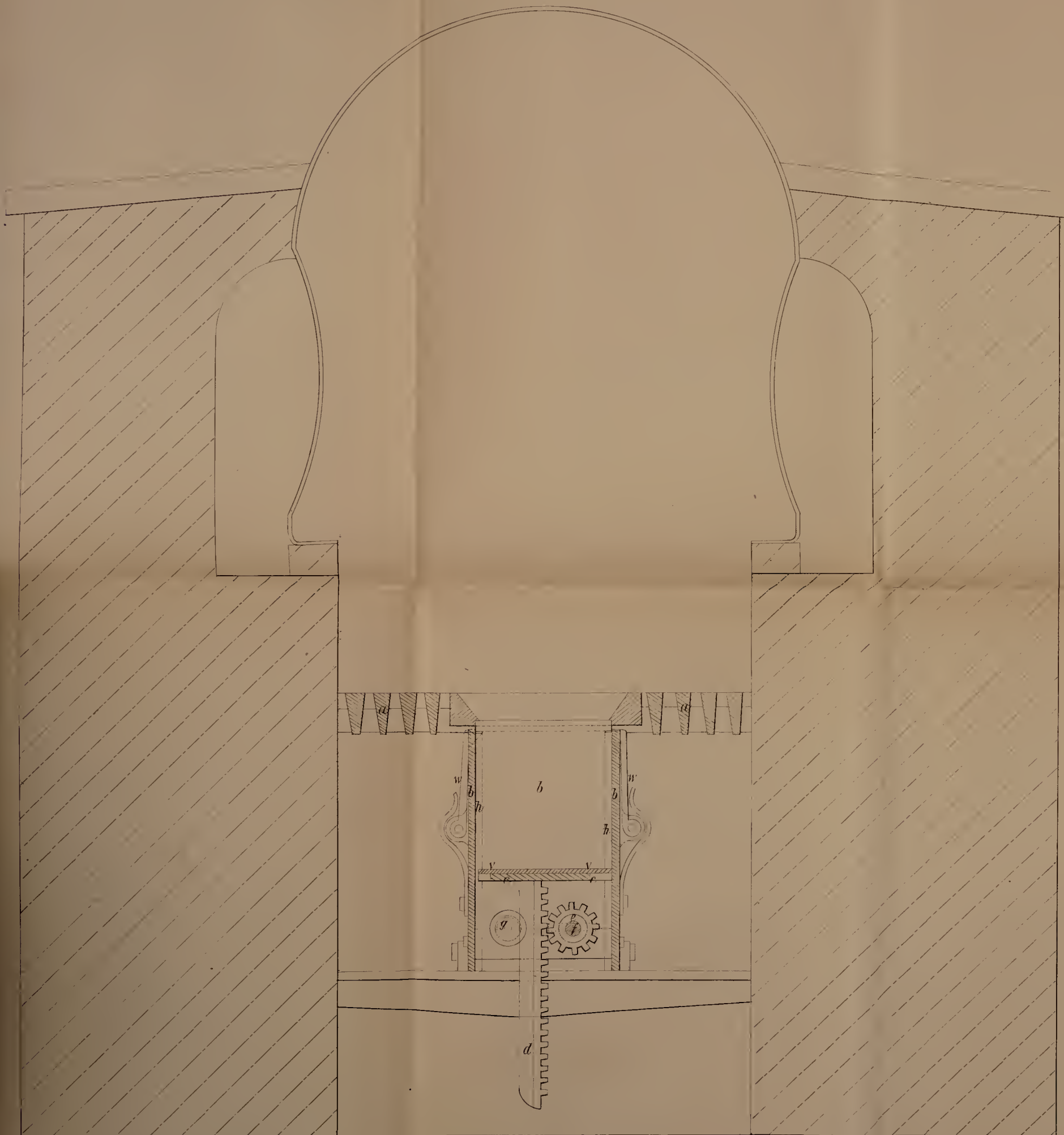


FIG. 7.

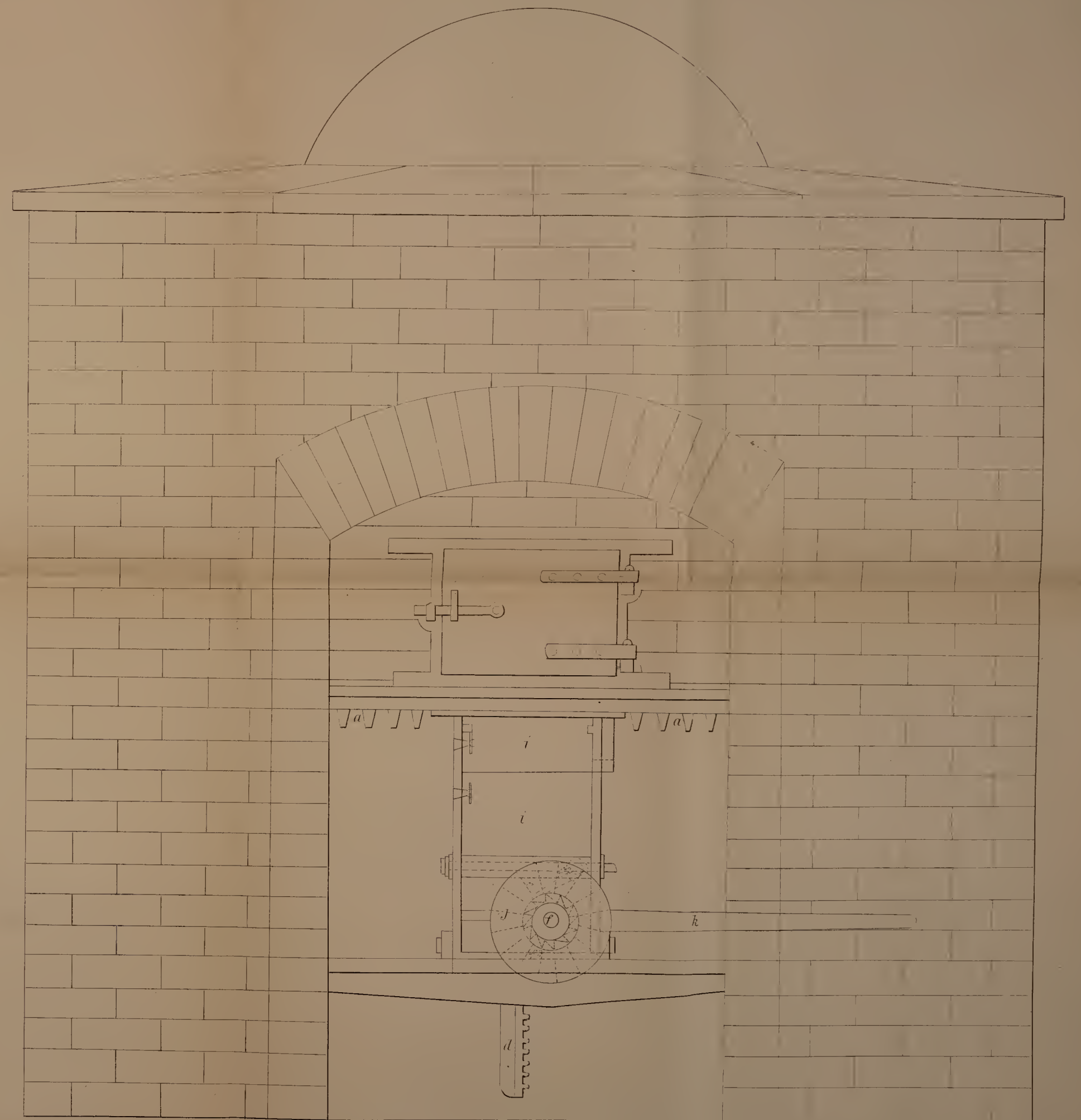


FIG. 9.

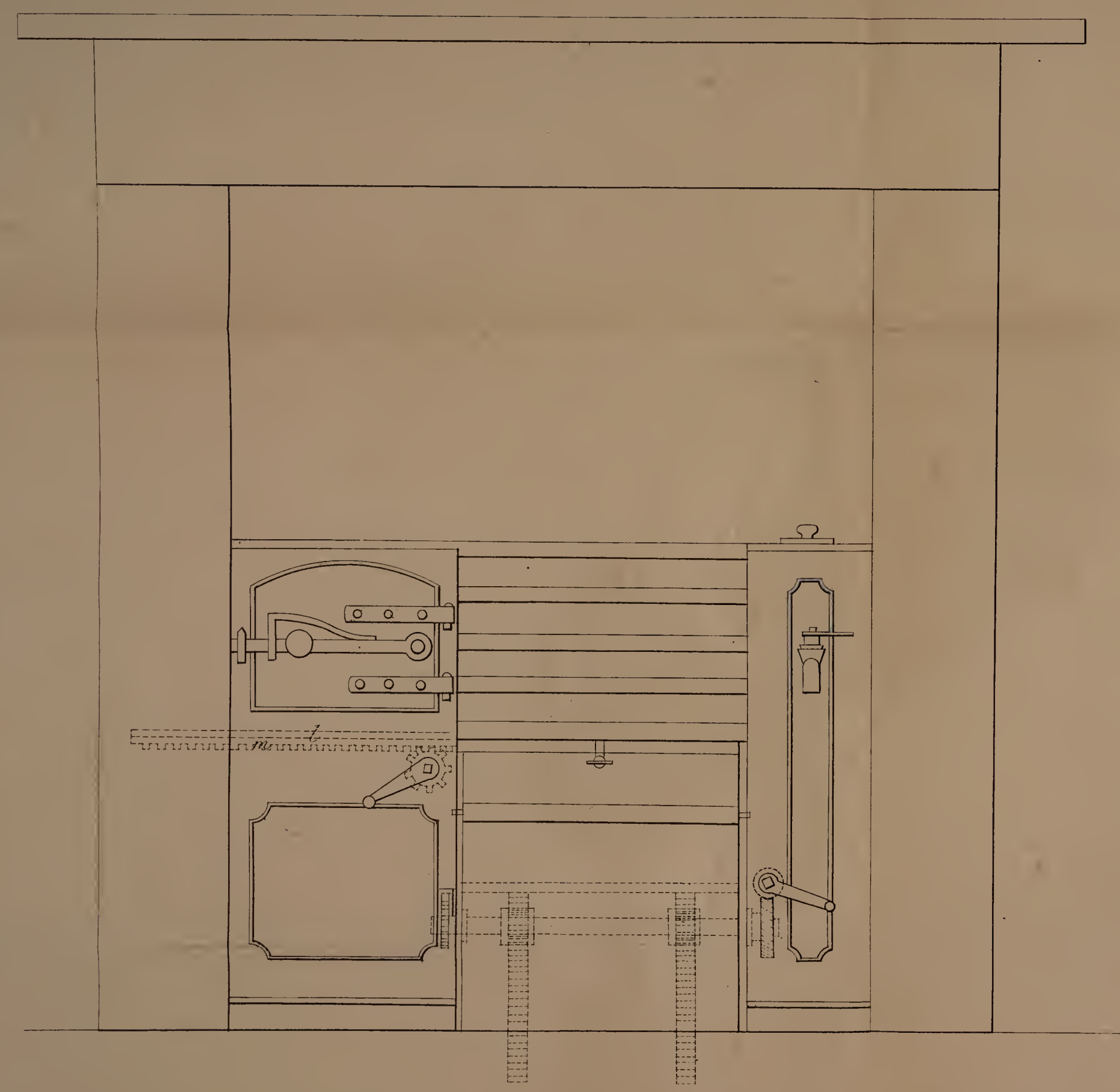
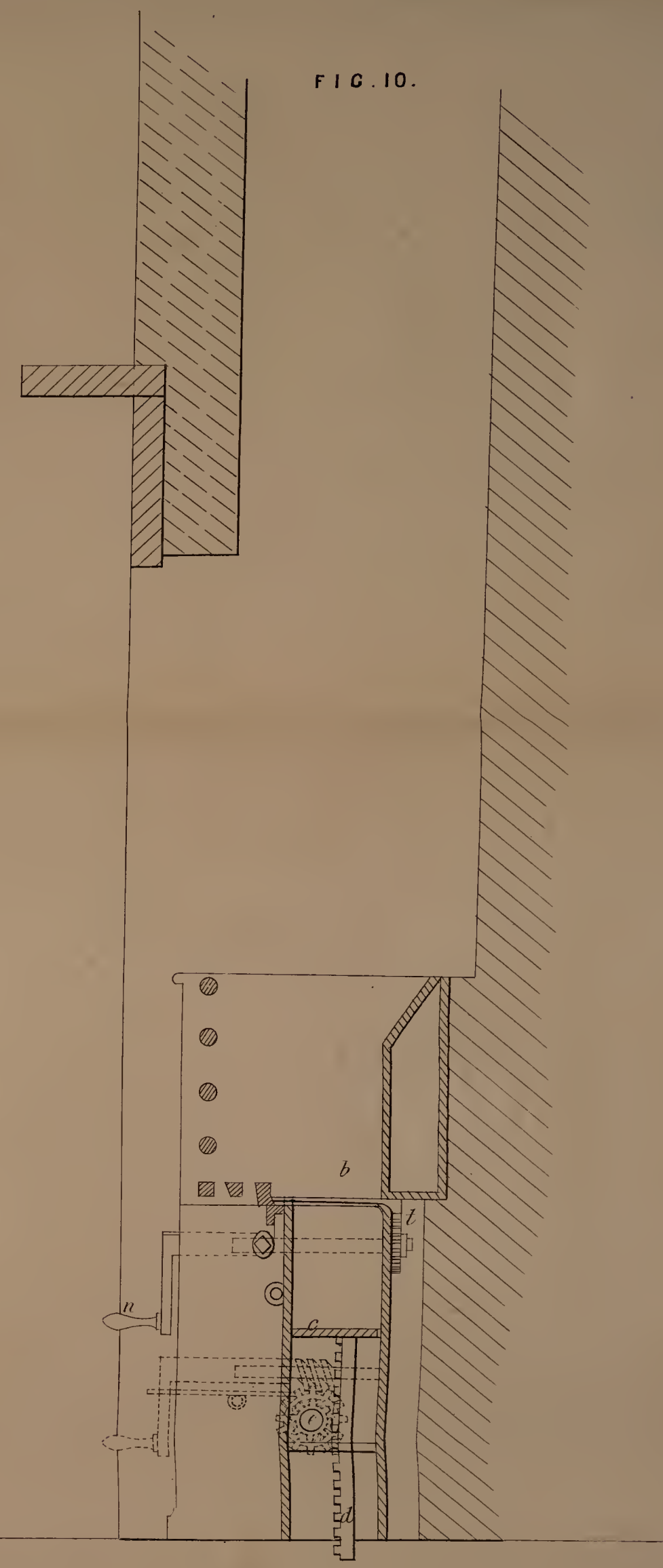


FIG. 10.



The enrolled drawing is partly colored.

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aided by a careful examination of those Figures, observing the slight variation of the construction of the parts in order to render them suitable for stoves and open fire-places.

Having thus described the nature of my Invention, and the manner in which the same is to be performed, I would remark that although I have been particular in describing the best means I am acquainted with for carrying out my Invention, I do not confine myself to the precise details shewn and described, as they may be varied, so long as the peculiar character of my Invention be retained, and I am aware that it is not new to supply fuel from below upwards into furnaces and fire-places by means of a chamber or piston or platform working therein, as similar means were described in the Specification of a Patent granted to John Cutler, of Great Queen Street, Lincoln's Inn Fields, on the Sixth day of January, One thousand eight hundred and fifteen. I do not therefore claim the same, nor do I claim any of the parts above described separately, or except as combined, to produce my Invention; but what I claim is, first, the application of a door to the chamber or coking oven to facilitate the supplying fuel thereto, as above described; secondly, I claim the mode of supporting the fuel by means of the plate or surface, when that plate or surface is used in combination with a piston and chamber or oven such as are herein described; and, thirdly, I claim the mode of applying a plate *v* working within the chamber or coking oven, as above described.

In witness whereof, I, the said Edward Foard, have hereunto set my hand and seal, this Sixteenth day of July, in the year of our Lord One thousand eight hundred and forty-one.

EDWARD (L.S.) FOARD.

AND BE IT REMEMBERED, that on the same Sixteenth day of July, in the year above mentioned, the aforesaid Edward Foard, came before our Lady the Queen in Her Chancery, and acknowledged the Specification aforesaid, and all and everything therein contained, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute in that case made and provided.

J. RUSSELL.

Inrolled the same Sixteenth day of July, in the year above written.

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